

## Illustrating actual customer benefits from Bently Nevada products

■ A refinery experienced abnormal vibration on a turbine compressor. In an effort to diagnose the cause of the problem, the customer temporarily installed a Transient Data Manager® (TDM) System leased from the local Bently Nevada office. The machinery was already equipped with XY probes, 3300 Monitors and a Keyphasor®. Upon reviewing the TDM data, the customer concluded the machine was experiencing a rub at the labyrinth seal area. Based on this diagnosis and the amplitude trend information from the TDM System, they decided to continue to operate until the upcoming regular outage period. During the outage in mid-April, they inspected the machine and found that the diagnosis was accurate. As a result of this event, the customer will permanently install the TDM System on their plant's Bently Nevada Monitors by the end of next year.

■ An ethylene plant had a 3300 Monitoring System that was indicating a thrust position alarm. The operators were reluctant to believe there actually was a problem. A rotating equipment specialist noticed the alarm condition and used their TDM System to observe trends in the thrust position. He deduced that the thrust collar had become loose and that the bearing was no longer supporting the axial loading of the machine. The machine was subsequently stopped and inspected; the specialist's conclusions were supported. Not only did the action save the machine from a serious axial rub, but it also caught the condition in time to save the seals.

■ A refinery recently installed a 3300 Monitoring System on their barrel compressor and turbine. During turbine startup, the system indicated that the rotor was running 20 mils into the active thrust pad. Since they had just installed the 3300 System and were confident that it was giving them accurate information, they decided to shut down the machine train to determine what was wrong. Upon investigation, they found salt from their steam system had been deposited on the turbine blades, causing the rotor position to move in the active direction.

■ A nuclear power facility received valuable information from two-plane proximity probes they recently installed on their exciter bearings. Previously-mounted shaft riders showed relatively low vibration, while case transducers were showing high vibration. After the orthogonal proximity probes were mounted on the machine, it became obvious that the plane the shaft rider was mounted in was very close to the plane of minimum vibration. The Bently Nevada proximity probes revealed a reversed precession Orbit which led the customer to suspect there was a foundation problem. After totally redoing their foundation, the vibration levels decreased dramatically.

■ Upon starting up a hydroturbine, a customer experienced an Alert condition on the thrust guide's radial vibration monitor. On investigation, there was noticeable vibration that is not normally present. It was discovered that at the last shutdown, the stator heaters were not turned on. Parts on

these machines loosen up when the stator is cold. This creates changing air gaps which cause stator vibration. The 3300 System detected this vibration as it was transmitted to the rotor from the stator. After the machine was run for two hours on light load, the stator warmed up sufficiently to close the gaps, and the vibration diminished to normal levels. Early detection of the situation allowed the machine to be warmed up slowly to eliminate possible winding damage.

■ A power plant with two 500 MW oil-fired units and two mechanical draft, saltwater cooling towers recently added a Trendmaster® 2000 System. The system includes a computer and printer, a 1500 foot transducer loop, 24 transducer interface modules and 24 velocity transducers. Data collected from the initial run of the cooling water fans immediately revealed a problem. A spike occurred at 11,000 rpm, the fundamental garmesh frequency of the intermediate-output gear. Second and third harmonics were also present. The gearbox was removed and disassembled. Misalignment was noted and corrected. Failure of the gearbox during the operating season could have resulted in \$15-\$20,000 in unscheduled maintenance costs and a violation of the Environmental Protection Agency Thermal Discharge Permit.

■ A customer reported a save on a reciprocating oxygen compressor. The compressor was shut down due to excessive rod drop as seen on a 9000 Series Position Monitor. Had the compressor not been monitored, they feel an oxygen explosion would have been likely. ■